

Continuation of Serial No.: 09/503,249

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

Claims 1-14 (canceled)

Claim 15 (currently amended) A method of making optical elements on a wafer level comprising:

lithographically making a master including an array a plurality of optical elements;

embossing imprinting a replica of said array plurality of optical elements in an imprintable material by applying said the master to an embossable the imprintable material;

providing a support substrate for the replica;

hardening the imprintable material to form a hardened replica;

removing the master from the hardened replica; and

dicing said separating the hardened replica on the support substrate to form individual optical elements, each individual optical element including the hardened replica and the support substrate, wherein the hardened replica is adhered to the support substrate sufficiently to avoid delamination therefrom during said separating.

Claim 16. (currently amended) The method as recited in claim 15, further comprising providing said embossable imprintable material in a thin film on a surface of the master prior to the imprinting embossing.

Claim 17. (currently amended) The method as recited in claim 15 16, further comprising wherein said imprinting includes:

providing the imprintable material to the master,

providing an adhesion promoter on a glass the support substrate prior to the

Continuation of Serial No.: 09/503,249

embossing and;

contacting a surface of the master having the imprintable material thereon to a surface of the substrate having the adhesion promoter thereon.

Claim 18. (currently amended) The method as recited in claim 15 ~~16~~, wherein ~~said glass substrate contains the support substrate includes~~ fiducial marks, the method and further comprising aligning said the master to the fiducial marks.

Claim 19. (original) The method as recited in claim 15, further comprising coating said replica with an anti-reflective coating.

Claim 20. (original) The method according to claim 15, further comprising selectively removing material from or adding material to said replica in a predetermined pattern.

Claim 21. (currently amended) The method according to claim 20, wherein selectively removing material from or adding occurs prior to said embossing imprinting.

Claim 22. (currently amended) The method according to claim 20, wherein selectively removing material from or adding occurs after said embossing imprinting.

Claim 23. (currently amended) The method according to claim 20, wherein selectively removing material from or adding includes providing metal pads on a surface opposite a side of said replica subject to said embossing imprinting.

Claim 24. (currently amended) The method as recited in claim 15, wherein said embossing includes embossing both sides of ~~said glass~~ the support substrate.

Continuation of Serial No.: 09/503,249

Claim 25. (currently amended) The method as recited in claim 24, wherein a different ~~wafer~~ master is used for embossing imprintable either side of said both sides.

Claim 26. (currently amended) The method as recited in claim 25, wherein a first ~~wafer~~ master includes diffractive optical elements and a second ~~wafer~~ master includes refractive optical elements.

Claim 27. (currently amended) The method as recited in claim 15 41, further comprising providing fiducial marks on both said the wafer master and said replica the support substrate.

Claim 28. (currently amended) The method according to claim [15] 41, further comprising:

confirming alignment of said replica the support substrate and said the wafer master in a mask aligner; and

tacking together the support substrate said replica and wafer master at discrete locations once alignment is confirmed.

Claim 29. (currently amended) The method according to claim 28, further comprising removing said replica the support substrate and said the wafer master from the mask aligner after said tacking and then hardening curing the embossable imprintable material.

Claim 30. (Amended) The method according to claim 15, wherein said applying imprinting includes initially bringing said wafer the master into incomplete contact with only a portion of the support substrate, with the imprintable material on at least one of the master and the support substrate said replica, and then bringing the entire master into

Continuation of Serial No.: 09/503,249

contact with the support substrate with the imprintable material therebetween.

Claims 31-37 (canceled).

Claim 38 (original) An optical element formed by the process recited in claim 15.

Claims 39-40 (canceled).

Claim 41. (original). The method as recited in claim 15, wherein said master is a wafer.

Claim 42. (original) The method as recited in claim 20, wherein said selectively removing or adding is lithographic.

Claim 43 (currently amended) The method as recited in claim 20, wherein said selectively removing or adding includes selectively removing embossable imprintable material.

Claim 44 (currently amended) The method as recited in claim 43, wherein said selectively removing embossable material includes providing metal in a pattern on said master and, after said embossing, washing removing away uncured unfixed embossable imprintable material.

Claim 45. (currently amended) The method as recited in claim 43, wherein said selectively removing or adding includes adding material where embossable imprintable material was removed.

Continuation of Serial No.: 09/503,249

Claim 46. (currently amended) The method as recited in claim 28, wherein said tacking includes providing localized curing fixing of said embossable imprintable material.

Claims 47-50. (canceled).

Claim 51. (new) The method according to claim 15, wherein said imprinting includes initially bringing the master into contact with a center of the support substrate, with the imprintable material on at least one of the master and the support substrate, and then bringing the entire master into contact with the support substrate with the imprintable material therebetween.

Claim 52. (new) The method according to claim 15, wherein said imprinting includes initially bringing the master into contact with an edge of the support substrate, with the imprintable material on at least one of the master and the support substrate, and then bringing the entire master into contact with the support substrate with the imprintable material therebetween

Claim 53. (new) A method of making optical elements comprising:

- making a master including an optical element;
- imprinting a replica of said optical element in an imprintable material by applying the master to the imprintable material;
- providing a support substrate for the replica;
- confirming alignment of the support substrate and the master;
- tacking together the support substrate and master at discrete locations once alignment is confirmed;
- fixing the imprintable material to form a hardened replica; and

Continuation of Serial No.: 09/503,249

removing the master from the hardened replica.

Claim 54. (new) The method according to claim 53, said confirming alignment of the support substrate and the wafer master is done in a mask aligner.

Claim 55. (new) The method according to claim 54, further comprising removing the support substrate and the wafer master from the mask aligner after said tacking and then fixing the imprintable material.

Claim 56. (new) The method according to claim 53, wherein said master includes a plurality of optical elements, the method further comprising separating the fixed replica on the support substrate to form individual optical elements, each individual optical element including the hardened replica and the support substrate, wherein the hardened replica is adhered to the support substrate sufficiently to avoid delamination therefrom during said separating.

Claim 57. (new) A method of making optical elements comprising:

making a master including an optical element;

imprinting a replica of said optical element in an imprintable material by applying the master to the imprintable material;

providing a support substrate for the replica, said imprinting further including initially bringing the master into contact with only a portion of the support substrate, with the imprintable material on at least one of the master and the support substrate, and then bringing the entire master into contact with the support substrate with the embossable material therebetween;

Continuation of Serial No.: 09/503,249

fixing the imprintable material to form a hardened replica; and
removing the master from the hardened replica.

Claim 58. (new) The method according to claim 57, wherein said initially bringing the master into contact includes contacting a central portion of the support substrate.

Claim 59. (new) The method according to claim 57, wherein said initially bringing the master into contact includes contacting a peripheral portion of the support substrate.

Claim 60. (new) The method according to claim 57, wherein said master includes a plurality of optical elements, the method further comprising separating the hardened replica on the support substrate to form individual optical elements, each individual optical element including the hardened replica and the support substrate, wherein the hardened replica is adhered to the support substrate sufficiently to avoid delamination therefrom during said separating.